

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application of

Applicant : Michael Donovan Mitchell et al.  
Serial No. : 10/705,572  
Filed : November 11, 2003  
Title : **WATER FILTER MATERIALS, WATER FILTERS AND KITS  
CONTAINING SILVER COATED PARTICLES AND PROCESSES FOR  
USING THE SAME**  
Docket No. : 8681RCR  
Examiner : Kim, Sun U  
Art Unit : 1797  
Conf. No. : 4234

**MAIL STOP APPEAL BRIEF - PATENTS**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

EFS Web Electronic Submission:  
April 7, 2009

Sir:

**BRIEF ON APPEAL**

This is an appeal from the Office Action mailed October 8, 2008, rejecting claims 7-9, 11-15 and 17-25, which are all of the claims in the application. On January 7, 2009 a Notice of Appeal with the accompanying fee was filed via facsimile. A Petition for a One-Month Extension of Time, and the fee required under 37 CFR §1.136, accompanies this paper providing for a timely submission up to and including April 7, 2009. A Credit Card Payment in the amount of \$130.00 (extension fee under 37 CFR §1.136) and \$540.00 (filing a brief in support of an appeal) also accompanies this paper in accordance with 37 CFR §41.20(b)(2).

**I. Real Party in Interest**

The real party in interest in this application is Pur Water Purification Products, Inc., by an assignment recorded in the files of the U.S. Patent and Trademark Office on December 22, 2006 under Reel 018668 and Frame 0431.

## **II. Related Appeals and Interferences**

Applicants know of currently pending related appeals or interferences in Application Serial Nos. 10/643,669 and 10/705,174, both filed on April 7, 2009, that would directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal. The related appeals or interferences are currently pending, therefore, no decisions have been rendered by the Board in Application Serial Nos. 10/643,669 and 10/705,174.

## **III. Status of Claims**

Claims 7-9, 11-15 and 17-25 are pending in this application; claims 1-6, 10 and 16 were previously canceled without prejudice. Claims 7-9, 11-15 and 17-25 stand finally rejected and are before the Board for consideration on appeal. A copy of the appealed claims is found in the Appendix attached to this brief.

## **IV. Status of Amendments**

All of the amendments previously filed in this application have been entered.

## **V. Summary of Claimed Subject Matter**

The following is a concise explanation of the subject matter defined in each of the independent claims and each of the dependent claims argued separately. Reference to the drawing figures and specifically depicted embodiments of the invention are for the convenience of the Board and are not to be interpreted as limitations on the claims.

In general, the claims relate to filters for providing potable water, kits that include filters for providing potable water and processes for providing potable water. Embodiments of Applicants' invention are directed to novel filter materials contained within the filter. Such filter materials provide improved microorganism removal from water in comparison to convention filters.

Claim 7

Independent claim 7 relates to "a filter for providing potable water," one embodiment of which is shown in Fig. 4 and discussed in the Specification beginning on page 26, line 18. The filter 20 comprises a housing 22 having an inlet 24 and an outlet 26 (see page 26, lines 19-20; Fig. 4) and a filter material 28 disposed within the housing 22 (see page 28, lines 1-4; Fig. 4). The filter material 28 is formed at least in part from a plurality of filter particles consisting of mesoporous activated carbon (see page 28, lines 5-10), wherein at least a portion of the plurality of filter particles is at least partially coated with silver or a silver-containing material (see page 28, lines 9-11). The filter particles have a sum of mesopore and macropore volumes between about 0.2 mL/g and about 2 mL/g (see page 16, lines 17-21), wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50 nm (see page 8, lines 10-12) and macropore means an intra-particle pore having a diameter greater than 50 nm (see page 8, lines 13-14). The filter particles have a total pore volume of greater than about 0.4 mL/g and less than about 3 mL/g (see page 16, lines 11-14). The filter particles have a ratio of the sum of the mesopore and macropore volumes to the total pore volume of greater than about 0.3 (see page 17, lines 10-12). The filter is operable to remove microorganisms from water flowing into the inlet and out of the outlet (see page 11, lines 6-14). The filter has a Filter Bacteria Log Removal of greater than about 2 logs and a Filter Viruses Log Removal of greater than about 1 log (see page 21, lines 1-10).

Claim 8

Claim 8 depends from claim 7 and relates to the plurality of the filter particles having a sum of the mesopore and the macropore volumes greater than 0.4 mL/g to about 2 mL/g, which is discussed on page 16, lines 17-21.

Claim 9

Claim 9 depends from claim 7 and relates to the plurality of the filter particles having a Bacterial Removal Index of greater than 99% and a Viruses Removal Index of greater than 90%, which is discussed on page 18, lines 2-13.

Claim 11

Claim 11 depends from claim 7 and relates to the filter material having a single-collector efficiency,  $\eta$ , of between 0.005 and 0.25, and a filter coefficient,  $\lambda$ , between about  $40 \text{ m}^{-1}$  and about  $14,000 \text{ m}^{-1}$ , which is discussed on page 20, lines 18-26.

Claim 12

Claim 12 depends from claim 7 and relates to the plurality of the filter particles being basic (see page 13, line 6) and having a point of zero charge between about 9 and about 12 (see page 13, lines 15-18) and an Oxidation Reduction Potential between about 290 mV and about 175 mV (see page 13, line 28 - page 14, page 1).

Claim 13

Independent claim 13 relates to "a filter for providing potable water," one embodiment of which is shown in Fig. 4 and discussed in the Specification beginning on page 26, line 18. The filter 20 comprises a housing 22 having an inlet 24 and an outlet 26 (see page 26, lines 19-20; Fig. 4) and a filter material 28 disposed within the housing 22 (see page 28, lines 1-4; Fig. 4). The filter material 28 is formed at least in part from a plurality of filter particles consisting of mesoporous activated carbon (see page 28, lines 5-11) and other materials selected from the group consisting of activated carbon powders, activated carbon granules, activated carbon fibers, zeolites, activated alumina, activated magnesia, diatomaceous earth, activated silica, hydrotalcites, glass, polyethylene fibers, polypropylene fibers, ethylene maleic anhydride copolymers fibers, sand, clay and mixtures thereof (see page 28, lines 11-17), wherein at least a portion of the other materials are coated with silver or a silver containing material (see page 28, lines 17-19). The filter particles have a sum of mesopore and macropore volumes between about  $0.2 \text{ mL/g}$  and about  $2 \text{ mL/g}$  (see page 16, lines 17-21), wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50 nm (see page 8, lines 10-12) and macropore means an intra-particle pore having a diameter greater than 50 nm (see page 8, lines 13-14). The filter particles have a total pore volume of greater than about  $0.4 \text{ mL/g}$  and less than about  $3 \text{ mL/g}$  (see page 16, lines 11-14). The filter particles have a ratio of the sum of the mesopore and macropore

volumes to the total pore volume of greater than about 0.3 (see page 17, lines 10-11). The filter is operable to remove microorganisms from water flowing into the inlet and out of the outlet (see page 11, lines 6-14). The filter has a Filter Bacteria Log Removal of greater than about 2 logs and a Filter Viruses Log Removal of greater than about 1 log (see page 21, lines 1-10).

Claim 14

Claim 14 depends from claim 7 and relates to "a kit" comprising the filter according to claim 7 and a package for containing the filter, which is discussed on page 38, lines 15-18. Either the package or the filter housing comprises information that the filter or filter material provides bacterial removal, virus removal, microbial removal, killing of bacteria, killing of viruses, killing of microbials, or any combination of these, which is discussed on page 38, lines 10-20.

Claim 15

Claim 15 depends from claim 13 and relates to "a kit" comprising the filter according to claim 13 and a package for containing the filter, which is discussed on page 38, lines 15-18. Either the package or the filter housing comprises information that the filter or filter material provides bacterial removal, virus removal, microbial removal, killing of bacteria, killing of viruses, killing of microbials, or any combination of these, which is discussed on page 38, lines 10-20.

Claim 17

Claim 17 depends from claim 7 and relates to "a process for providing potable water" comprising passing contaminated water through the filter of claim 7 to provide potable water, which is discussed on page 27, lines 11-15.

Claim 18

Claim 18 depends from claim 13 and relates to "a process for providing potable water" comprising passing contaminated water through the filter of claim 13 to provide potable water, which is discussed on page 27, lines 11-15.

Claim 19

Claim 19 depends from claim 8 and relates to filter particles wherein the sum of the mesopore and macropore volume is greater than about 0.4 mL/g and less than about 1 mL/g, which is discussed at page 16, lines 17-21.

Claim 20

Claim 20 depends from claim 7 and relates to filter particles wherein the total pore volume is greater than about 0.4 mL/g and less than about 2 mL/g, which is discussed at page 16, lines 11-14.

Claim 21

Claim 21 depends from claim 7 and relates to filter particles wherein the pore volume is at least 0.03 mL/g for pore diameters between about 4 nm and about 6 nm, which is discussed at page 16, line 29 - page 17, line 1.

Claim 22

Claim 22 depends from claim 7 and relates to a filter that has a Filter Bacterial Log Removal of greater than about 4 logs, and a Filter Viruses Log Removal of greater than about 2 logs, which is discussed at page 21, lines 1-10.

Claim 23

Claim 23 depends from claim 22 and relates to a filter that has a Filter Bacterial Log Removal of greater than about 6 logs, and a Filter Viruses Log Removal of greater than about 4 logs, which is discussed at page 21, lines 1-10.

Claim 24

Claim 24 depends from claim 7 and relates to a filter that has a single-collector efficiency,  $\eta$ , of greater than about 0.002, which is discussed at page 20, lines 18-21.

Claim 25

Claim 25 depends from claim 7 and relates to filter particles that are wood-based activated carbon particles having a Brunauer, Emmet, and Teller (BET) specific surface area between about 1,000 m<sup>2</sup>/g and about 2,000 m<sup>2</sup>/g (see page 15, lines 25-28), a total pore volume between about 0.8 mL/g and about 2 mL/g (see page 16, lines 11-14), and the sum of the mesopore and macropore volumes is between about 0.4 mL/g and about 1.5 mL/g (see page 16, lines 17-21).

**VI. Grounds of Rejection to be Reviewed on Appeal**

The grounds of rejection for review on appeal are:

- (1) Claims 7-9, 11-13 and 17-24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Cannon et al. (US 6,881,348) in view of Hill (US 1,782,850) and Koslow (US 6,630,016);
- (2) Claims 14-15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Cannon et al. (US 6,881,348) in view of Hill (US 1,782,850) and Koslow (US 6,630,016) as applied to claims 7 and 13, and further in view of Jagtoyen et al. (US 2004/0040906); and
- (3) Claim 25 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Cannon et al. (US 6,881,348) in view of Hill (US 1,782,850) and Koslow (US 6,630,016) as applied to claim 7, and further in view of Derbyshire et al. (US 6,057,262).

**VII. Argument**

Appellants submit that the filter for providing potable water defined by independent claims 7 and 13 and claims 8, 9, 11, 12, and 17-25 dependent thereon are nonobvious over and patentably distinguishable from the references cited by the Examiner. Accordingly, the rejections under 35 U.S.C. §103(a) should be reversed, and favorable action by the Board is respectfully requested.

**A. Rejections under 35 USC § 103(a)**

In general, to establish a prima facie case of obviousness, the Examiner must show, by reasoning or evidence, one or more of the following rationales: (A) Combining prior art elements according to known methods to yield predictable results; (B) Simple substitution of one known element for another to obtain predictable results; (C) Use of known technique to improve similar devices (methods, or products) in the same way; (D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results; (E) "Obvious to try" - choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; (F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art; or (G) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention. See MPEP §2143 and *KSR International Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 167 L.Ed.2d 705, 82 USPQ2d 1385 (2007). The Examiner has failed to establish any of the rationales set forth above to support the conclusion of obviousness.

A rejection based on §103 clearly must rest on a factual basis, and these facts must be interpreted without hindsight reconstruction of the invention from the prior art. *In re Warner*, 154 USPQ 173, 178 (CCPA 1967). The Examiner may *not*, because he may doubt that the invention is patentable, resort to speculation, unfounded assumptions, or hindsight reconstruction to supply deficiencies in his required factual basis. *Id.*

**1. Rejection under 35 USC § 103(a) over Cannon et al. (US 6,881,348) in view of Hill (US 1,782,850) and Koslow (US 6,630,016)**

**a.) Claims 7 and 13 as representative of claims 8, 9, 11, 12, and 17-24**

In the final Office Action of October 8, 2008, the Examiner rejected claims 7-9, 11-13, and 17-24 under 35 USC §103(a) as unpatentable over Cannon et al. in view of Hill and Koslow. This rejection was clearly based on the Examiner's incorrect and unsupported assertion that the prior art references teach a filter for the removal of microorganisms from water that includes



mesoporous activated carbon particles modified with a coating of silver. Applicants controvert this rejection for the reasons set forth below.

In that final Office Action, in regard to Applicants' claim 7, the Examiner asserted that Cannon et al. teach a column, i.e. "a housing," having an inlet and an outlet and a filter material disposed in the column comprising a plurality of mesoporous activated carbon filter particles loaded with a cationic polymer. Further, the Examiner asserted that the characterization of mesoporous carbon by the claimed sum of the mesopore and macropore volumes of the filter particles, the claimed total pore volume of the filter particles, and the claimed ratio of the sum of the mesopore and macropore volumes of the filter particles to the total pore volume are inherent in the mesoporous carbon of Cannon et al. by its mesoporosity.

However, Applicants assert that Cannon et al. provides no teachings of macropores. As defined in the Applicants' specification, the "sum of the mesopore and macropore volumes" is equal to the difference between the total pore volume and the micropore volume (page 8, lines 24-29). Thus, as defined in the specification, the mesoporous activated carbon filter particles require a blend of macropores, mesopores, and micropores. Cannon et al. provide teachings regarding mesopore volume and micropore volume (col. 8, lines 4-8; col. 9, lines 29-32); however, Cannon et al. provide no teaching of macropores as required in claims 7 and 13. By failing to teach macropores, Cannon et al. consequently also fail to teach that the sum of the mesopore and macropore volumes of said filter particles is between about 0.2 mL/g and about 2 mL/g, wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50nm, and macropore means an intra-particle pore having a diameter greater than 50nm, as required in claims 7 and 13.

In fact, the Examiner acknowledges that Cannon et al. fail to teach that the sum of the mesopore and macropore volumes of said filter particles is between about 0.2 mL/g and about 2 mL/g; nevertheless, the Examiner asserts that this teaching is inherent in view of Cannon et al.'s alleged disclosure of "mesoporosity." However, to establish a prima facie case of obviousness based on inherency, the prior art products must be identical or substantially identical to the claimed structure. *In re Best*, 562 F.2d 1252, 1255, 195 U.S.P.Q. 430, 433 (CCPA 1977). As stated above, Cannon et al. fail to teach mesoporous activated carbon filter particles comprising

macropores. By failing to teach this structural component, the activated carbon structure taught by Cannon et al. is not identical or substantially identical to the claimed activated carbon structure, and therefore, the Examiner has failed to establish a prima facie case of obviousness based on inherency. Absent an impermissible hindsight reconstruction of the present disclosure and claims, it stands to reason that Cannon et al. cannot inherently teach that the sum of the mesopore and macropore volumes of said filter particles is between about 0.2 mL/g and about 2 mL/g, when Cannon et al. does not minimally teach macropores.

Moreover, on pages 2-3 of the final Office Action, the Examiner acknowledged that Cannon et al. does not teach mesoporous activated carbon filter particles at least partially coated with silver or a silver containing material for bacteria and virus removal. The Examiner then cited Hill for the teaching that bacteria are removed from water by activated carbon and cited Koslow for the teaching of a filter comprising a silver, effective biocide, coated or precipitated onto the filter particles coated with cationic polymers. The Examiner further asserted that the bacteria removal capability of mesoporous activated carbon is an inherent property of activated carbon.

In regard to Applicants' claim 13, the Examiner additionally cited Koslow for the teaching of activated carbon particles made in combination with additional particles made of diatomaceous earth, silicates, sand, clay, etc. for enhanced microbiological interception capabilities, and coated with silver, effective biocide, onto the filter particles coated with cationic polymers.

The reasons given by the Examiner in the final rejection for combining the reference teachings mischaracterize the nature of the references to facilitate their combination. The combination of Cannon et al., Hill and Koslow is made possible only through impermissible hindsight review of the references, and a self-serving interpretation of their disclosures. That is, the Examiner has effectively used Applicants' claims as a blueprint for the proposed combination. However, the Examiner is not entitled to use a claim as a shopping list of elements which are to be located in diverse prior art references and then combined with no reason.

The invention itself, as delineated in the claims, may not be used as a template to find separate, individual elements in the prior art, and then to combine the elements and pronounce the combination obvious. The United States Supreme Court addressed the proper standards to combine references under 35 U.S.C. 103 in *KSR International Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 167 L.Ed.2d 705, 82 USPQ2d 1385 (2007). The Court, while disapproving a strict application of the Federal Circuit's "TSM" (teaching, suggestion or motivation) test for determining whether it would have been obvious to combine references under 35 U.S.C. §103, adopted an objective standard in which all of the facts and circumstances associated with the invention and the prior art are considered. In point of fact, the Supreme Court cited with approval Federal Circuit cases adopting a more flexible TSM standard, and reaffirmed the standards for obviousness set out in *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966). Judged in this light, the claimed invention cannot be said to be an obvious combination of the teachings of the references.

Nonetheless, the Examiner concluded on page 3 of the October 8, 2008 final Office Action that it would have been obvious to one having ordinary skill in the art to make a filter using mesoporous activated carbon particles modified with a coating of silver to provide potable water by employing the "sheer bacteria removal capability of activated carbon as suggested by Hill" with the inclusion of "silver effective biocide under conditions of high ionic strength as suggested by Koslow."

However, Cannon et al.'s deficiency is not remedied by Hill or Koslow, alone or in combination, as none of those references teach mesoporous activated carbon filter particles at least partially coated with silver or a silver containing material for bacteria and virus removal. Hill discloses a method comprising stirring a suspension of activated carbon in water by "giv[ing] the body of liquid in the settling vessel a slow rotational movement, say, of the order of one or two turns per hour" (col. 2, lines 98-100). Although Hill states that carbon, while lacking bactericidal properties, is able to remove bacteria (col. 2, lines 56-58), Hill goes on to say that because of the difficulty in freeing water of added carbon, the use of carbon remains impracticable (col. 2, lines 60-73). Hill attempts to address this impracticability with the disclosed stirring technique. However, Hill is void of any mention, teaching, suggestion, or motivation to

provide a filter material formed at least in part from a plurality of filter particles consisting of mesoporous activated carbon, wherein at least a portion of said plurality of filter particles is at least partially coated with silver or a silver-containing material, wherein the filter is operable to remove microorganisms, as recited in Applicants' claims. The Applicants' claims specifically disclose a filter that has a Filter Bacteria Log Removal of greater than about 2 logs and a Filter Viruses Log Removal of greater than about 1 log. Filter Bacteria Log Removal capability and Filter Viruses Log Removal capability are specifically defined on pages 7-8 of the specification. Hill does not teach this specifically defined Filter Bacteria Log Removal capability and/or specific Filter Viruses Log Removal capability.

Koslow discloses a filter including, among other things, a filter medium comprising: (a) a microporous structure comprising active particles; and (b) a microbiological interception enhancing agent comprising a cationic material plus a biologically active metal (col. 1, lines 29-64). The structure is described as being microporous in that it has a mean free flow path of less than about 2000 nm (col. 1, line 32; col. 3, lines 42-44), *i.e.*, it has a microporous *inter-particle* pore volume. In contrast, Applicants claimed filter comprises, among other things, a filter material formed at least in part from a plurality of filter particles consisting of mesoporous activated carbon, where the sum of the mesopore and macropore volumes of the filter particles is between about 0.2 mL/g and 2 mL/g; wherein mesopore means an *intra-particle* pore having a diameter between 2 nm and 50 nm, and macropore means an *intra-particle* pore having a diameter greater than 50 nm. Moreover, importantly, Koslow is void of any mention, teaching, suggestion, or motivation to use mesoporous activated carbon, coated with silver or not, as recited in Applicants claims in a filter for providing potable water, let alone in a filter operable to remove microorganisms. Moreover, Koslow does not teach the specifically defined Filter Bacteria Log Removal and/or the specific Filter Viruses Log Removal as claimed by the Applicants.

Applicants submit that they have surprisingly found that a filter utilizing mesoporous activated carbon, as claimed, is useful in the removal of bacteria and viruses from water. Applicants demonstrate this, for example, in the results shown in Figures 7a and 7b, where the performance of a filter according to the invention (mesoporous RGC) is compared to that of a

conventional filter (containing coconut microporous activated carbon particles). As can be seen in Fig. 7a, the inventive filter is effective in removing *E. coli* for about 240 L of cumulative water volume, whereas the conventional filter fails at less than 40 L. As can be seen in Fig. 7b, the inventive filter is effective in removing MS-2 for about 80 to 100 L of cumulative water volume, whereas the conventional filter fails at less than 20 L. As the Supreme Court stated in *KSR International Co. v. Teleflex Inc.*, the fact that elements work together in an unexpected and fruitful manner supports the conclusion that a combination is not obvious to those skilled in the art.. 127 S. Ct. 1727, 82 U.S.P.Q. 2d 1385 (2007). Due to the unexpected results achieved by the claimed water filter device of claims 7 and 13, Applicants further assert that the claimed water filter device is nonobvious over the cited references.

Furthermore, because those results show that filters utilizing different activated carbon sources may provide wildly differing filtration properties and efficiencies, there would be no reasonable expectation of success (in effectively removing microorganisms from water) by substituting microporous activated carbon particles coated with a silver or silver-containing material for the mesoporous bituminous or lignite GAC particles of the filter of Cannon et al. In addition, there would certainly be no reasonable expectation of success in providing a filter with the properties of a Filter Bacteria Log Removal of greater than about 2 logs and a Filter Viruses Log Removal of greater than about 1 log, as recited by the claims. As previously stated, Cannon et al. and Koslow do not teach the removal of microorganisms from water. Consequently, even in view of the vague teachings of Hill, one skilled in the art would not consider it obvious to utilize the microporous activated carbon particles coated with a silver or silver-containing material of Koslow within the filter of Cannon et al. to provide the specific claimed microorganism filtration properties.

Applicants therefore submit that the Examiner is wrong in the assertion that the use of mesoporous activated carbon particles modified with a coating of silver was known and therefore it would have been obvious to the skilled person to yield the predictable result of providing potable water by employing the sheer bacteria removal capability of activated carbon. As demonstrated by Applicants, all varieties of activated carbons do not function in similar manners, and cannot simply be interchanged with a reasonable expectation of success. Applicants' claims

particularly point out and distinctly claim certain mesoporous activated carbons for use in filter material to remove bacteria and viruses, as well as specific microorganism filtration properties.

Therefore, Applicants submit that the Examiner has failed to establish a *prima facie* case of obviousness by failing to provide the required evidence and reasoning to combine the reference teachings in the manner proposed. Even if combined, the reference teachings still fail to teach the subject matter recited in claims 8, 9, 11, 12, and 17-24.

2. Rejection under 35 USC § 103(a) over Cannon et al. (US 6,881,348) in view of Hill (US 1,782,850) and Koslow (US 6,630,016) as applied to claims 7 and 13, and further in view of Jagtoyen et al. (US 2004/0040906)

In the final Office Action of October 8, 2008, the Examiner rejected claims 14 and 15 under 35 USC § 103(a) as unpatentable over the Base References (Cannon et al., Hill and Koslow) in further view of Jagtoyen et al. This rejection was clearly based on the Examiner's incorrect and unsupported assertion that the prior art references teach a filter utilizing mesoporous activated carbon particles modified with a coating of silver (as detailed above). Accordingly, Applicants renew their arguments above as they relate to the Base References.

Jagtoyen et al. is narrowly cited for the teaching of a package for containing the filter comprising a housing containing a filter material of activated carbon and information that describes the use of the filter for removal of pathogens, particularly viruses. However, Jagtoyen et al. do not teach, for example, a filter comprising a mesoporous activated carbon filter material. As a result, Applicants submit that deficiencies of the Base References are not remedied by the teachings of Jagtoyen et al., and that claims 14-15 are non-obvious, at least by virtue of directly claiming or depending on a claim that recites a filter comprising, among other things, a filter material formed at least in part from a plurality of filter particles consisting of mesoporous activated carbon, where the sum of the sum of the mesopore and macropore volumes of the filter particles is between about 0.2 mL/g and 2 mL/g; wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50 nm, and macropore means an intra-particle pore having a diameter greater than 50 nm, wherein the filter is operable to remove microorganisms, and

wherein the filter that has a Filter Bacteria Log Removal of greater than about 2 logs and a Filter Viruses Log Removal of greater than about 1 log.

3. Rejection under 35 USC § 103(a) over Cannon et al. (US 6,881,348) in view of Hill (US 1,782,850) and Koslow (US 6,630,016) as applied to claim 7, and further in view of Derbyshire et al. (US 6,057,262)

In the final Office Action of October 8, 2008, the Examiner rejected claim 25 under 35 USC §103(a) as unpatentable over the Base References (Cannon et al., Hill and Koslow) in further view of Derbyshire et al. This rejection was clearly based on the Examiner's incorrect and unsupported assertion that the prior art references teach a filter utilizing mesoporous activated carbon particles modified with a coating of silver (as detailed above). Accordingly, Applicants renew their arguments above as they relate to the Base References.

Derbyshire et al. is narrowly cited for the teaching of mesoporous granular activated carbon particles made from wood, nut shell, fruit pit and stone, peat, lignite and sub bituminous coal wherein mesoporous carbon is used for adsorption of large molecules taking advantage of relatively high pore surface area for increased adsorption activity. However, Derbyshire et al. do not teach, for example, a filter for the removal of microorganisms from water. As a result, Applicants submit that deficiencies of the Base References are not remedied by the teachings of Derbyshire et al., and that claim 25 is non-obvious, at least by virtue of directly claiming or depending on a claim that recites a filter comprising, among other things, a filter material formed at least in part from a plurality of filter particles consisting of mesoporous activated carbon, where the sum of the sum of the mesopore and macropore volumes of the filter particles is between about 0.2 mL/g and 2 mL/g; wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50 nm, and macropore means an intra-particle pore having a diameter greater than 50 nm, wherein the filter is operable to remove microorganisms, and wherein the filter that has a Filter Bacteria Log Removal of greater than about 2 logs and a Filter Viruses Log Removal of greater than about 1 log.

### **VIII. Conclusion**

Applicants respectfully submit that there are clear errors in the rejections to claims 7-9, 11-15 and 17-25 maintained from the previous final Office Action dated October 8, 2008, and that essential elements to establish a *prima facie* case of obviousness have not been met. In particular, as discussed in detail above, the cited references do not disclose all the limitations in the rejected claims.

Therefore, it is submitted that the claims pending in the instant application are allowable. The Board is respectfully requested to reverse all the rejections made by the Examiner in their entirety.

Respectfully submitted,

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AJM/AMM



CLAIMS APPENDIX

7. A filter for providing potable water, comprising:
- (a) a housing having an inlet and an outlet; and
  - (b) a filter material disposed within said housing formed at least in part from a plurality of filter particles consisting of mesoporous activated carbon, wherein at least a portion of said plurality of filter particles is at least partially coated with silver or a silver-containing material, and wherein:
    - (i) the sum of the mesopore and macropore volumes of said filter particles is between about 0.2 mL/g and about 2 mL/g; wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50 nm and macropore means an intra-particle pore having a diameter greater than 50 nm;
    - (ii) the total pore volume of said filter particles is greater than about 0.4 mL/g and less than about 3 mL/g; and
    - (iii) the ratio of the sum of the mesopore and macropore volumes to the total pore volume of said filter particles is greater than about 0.3;

wherein said filter is operable to remove microorganisms from water flowing into said inlet and out of said outlet; and

wherein said filter has a Filter Bacteria Log Removal of greater than about 2 logs and a Filter Viruses Log Removal of greater than about 1 log.

8. The filter of claim 7, wherein the sum of the mesopore and the macropore volumes of said plurality of filter particles is from greater than 0.4 mL/g to about 2 mL/g.

9. The filter of claim 7, wherein said plurality of filter particles has a Bacteria Removal Index of greater than about 99% and a Viruses Removal Index of greater than about 90%.
11. The filter of claim 7, wherein said filter material has a single-collector efficiency,  $\eta$ , of between about 0.005 and 0.25, and a filter coefficient,  $\lambda$ , between about  $40 \text{ m}^{-1}$  and about  $14,000 \text{ m}^{-1}$ .
12. The filter of claim 7, wherein said plurality of filter particles are basic and have a point of zero charge between about 9 and about 12, an Oxidation Reduction Potential between about 290 mV and about 175 mV.
13. A filter for providing potable water, comprising:
  - (a) a housing having an inlet and an outlet; and
  - (b) a filter material disposed within said housing formed at least in part from a plurality of filter particles consisting of mesoporous activated carbon and other materials selected from the group consisting of activated carbon powders, activated carbon granules, activated carbon fibers, zeolites, activated alumina, activated magnesia, diatomaceous earth, activated silica, hydrotalcites, glass, polyethylene fibers, polypropylene fibers, ethylene maleic anhydride copolymers fibers, sand, clay and mixtures thereof, wherein at least a portion of the other materials are coated with silver or a silver-containing material, wherein:
    - (i) the sum of the mesopore and macropore volumes of said filter particles is between about 0.2 mL/g and about 2 mL/g; wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50 nm, and macropore means an intra-particle pore having a diameter greater than 50 nm;

- (ii) the total pore volume of said filter particles is greater than about 0.4 mL/g and less than about 3 mL/g; and
- (iii) the ratio of the sum of the mesopore and macropore volumes to the total pore volume of said filter particles is greater than about 0.3;

wherein said filter is operable to remove microorganisms from water flowing into said inlet and out of said outlet; and

wherein said filter has a Filter Bacteria Log Removal of greater than about 2 logs and a Filter Viruses Log Removal of greater than about 1 log.

14. A kit comprising:

- i) a filter according to claim 7; and
- ii) a package for containing the filter;

wherein either the package or the filter housing comprises information that the filter or filter material provides: bacterial removal; virus removal; microbial removal; killing of bacteria, killing of viruses, killing of microbials, or any combination of these.

15. A kit comprising:

- i) a filter according to claim 13; and
- ii) a package for containing the filter;

wherein either the package or the filter housing comprises information that the filter or filter material provides: bacterial removal; virus removal; microbial removal; killing of bacteria, killing of viruses, killing of microbials, or any combination of these.

17. A process for providing potable water, comprising passing contaminated water through the filter of claim 7 to provide potable water.

18. A process for providing potable water, comprising passing contaminated water through the filter of claim 13 to provide potable water.
19. The filter of claim 8, wherein the sum of the mesopore and macropore volume of said filter particles is greater than about 0.4 mL/g and less than about 1 mL/g.
20. The filter of claim 7, wherein the total pore volume of said filter particles is greater than about 0.4 mL/g and less than about 2 mL/g.
21. The filter of claim 7, wherein the pore volume is at least 0.03 mL/g for pore diameters between about 4 nm and about 6 nm.
22. The filter of claim 7, wherein said filter has a Filter Bacteria Log Removal of greater than about 4 logs, and a Filter Viruses Log Removal of greater than about 2 logs.
23. The filter of claim 22, wherein said filter has a Filter Bacteria Log Removal of greater than about 6 logs, and a Filter Viruses Log Removal of greater than about 4 logs.
24. The filter of claim 7, wherein said filter has a single-collector efficiency,  $\eta$ , of greater than about 0.002.
25. The filter of claim 7, wherein said filter particles are wood-based activated carbon particles having a Brunauer, Emmet, and Teller (BET) specific surface area between about 1,000 m<sup>2</sup>/g and about 2,000 m<sup>2</sup>/g, a total pore volume between about 0.8 mL/g and about 2 mL/g, and the sum of the mesopore and macropore volumes is between about 0.4 mL/g and about 1.5 mL/g.

EVIDENCE APPENDIX

NONE

RELATED PROCEEDINGS APPENDIX

Applicants know of currently pending related appeals or interferences in Application Serial Nos. 10/643,669 and 10/705,174 that would directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal. The related appeals or interferences are currently pending, therefore, no decisions have been rendered by the Board in Application Serial Nos. 10/643,669 and 10/705,174.